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MOUNTAIN FARMING IN THE OZARK AREA OF WESTERN ARKANSAS

by

GEORGE TOWNSEND

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF AGRICULTURAL ECONOMICS

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MOUNTAIN FARMING IN THE OZARK AREA OF WESTERN ARKANSAS

With Particular Reference to Goat Dairying As a Use for Low-grade Land

By

George Townsend, Associate Agricultural Economist

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INTRODUCTION

So-called "mountain farmers" of the Ozark and Appalachian hill areas represent a rather important segment of the national farm pattern. However, the subsistence sort of farming so widely practiced in these areas is too often the object of undeserved ridicule and perhaps too seldom the object of needed consideration from people who are professionally concerned with problems of the people and the land. Ultimately, a large body of material must be assembled if the subject is to be appraised properly and solutions are to be provided for the problems of low-income farmers who, either because of personal preference or through the compulsion of circumstances, are stranded on the meager land resources of our Southern mountain areas. Because of the magnitude of the problems and their ramifications, the undertaking, of necessity, will be accomplished piecemeal.

This report is the result of a study which was primarily concerned with examining the production set-up and the operation of a few farms in one locality of the Western Ozark Mountain Area of Arkansas. The objectives of the undertaking were twofold: (1) to ascertain the sources and the level of income obtained by a representative group of "mountain farmers"; and (2) to develop and analyze data describing the production requirements and returns for each of the more important farm enterprises common to the locality.

Of particular importance in influencing the choice of the locality to be studied and the selection of sample cases, is the occurrence of a rather unique kind of dairy enterprise wherein butterfat is produced by milk goats and is marketed on the same price basis as, and frequently along with, cream produced from cows. Because of the ability of the goats to utilize profitably land that would otherwise be wasteland and because of the unusual character of the enterprise, goat dairying has been given more detailed consideration than other livestock enterprises or other aspects of farm organization and operation.

A significant feature of this kind of farming is a characteristically simple way of living that places little value on management beyond that needed to provide the minimum requirements of food, clothing, and shelter, and perhaps a little more. The usual farm holding is small and the land is exceedingly poor, but even these meager resources are not developed to their full potentialities. Commercial enterprises are limited mainly to "skimming" the low-volume and unforced livestock production which results from grazing cut-over woodland and underdeveloped pastures. Moreover, capital investments are low and cash operating expenses are usually small. Hence, farming of this kind is a comparatively simple business as contrasted to the commercialized farming of some other parts of the South, and has been aptly termed "low pressure livestock farming".

The character of the material developed by the study provided the basis for the organization of this report. The first section describes various aspects of farm organization, operation, and earnings in 1940. The second section presents the usual, or typical, handling practices, production requirements, and production rates for milk goats and the three other livestock enterprises from which the income of most of the farms is derived. The third section compares the four livestock enterprises in terms of their suitability as major farm enterprises. The final section is devoted to an over-all consideration of opportunities for expanding goat dairying and some facts bearing upon the feasibility of cheese manufacturing as a possible means of improving market outlets for goat's milk. This material should prove to be of more than passing interest to agricultural workers dealing with farmers and farm programs in areas similar to the locality studied, and to persons who contemplate the purchase or operation of an Ozark farm.

Description of the Area

The Western Ozark Mountain Area of Arkansas includes portions or all of 12 counties and occupies an area of approximately 3,570,000 acres in the northwestern corner of the State (fig. 1). Less than 60 percent of this area is in farm ownership. Farming is characterized by a high degree of self-sufficiency

WESTERN OZARK MOUNTAIN AREA OF ARKANSAS

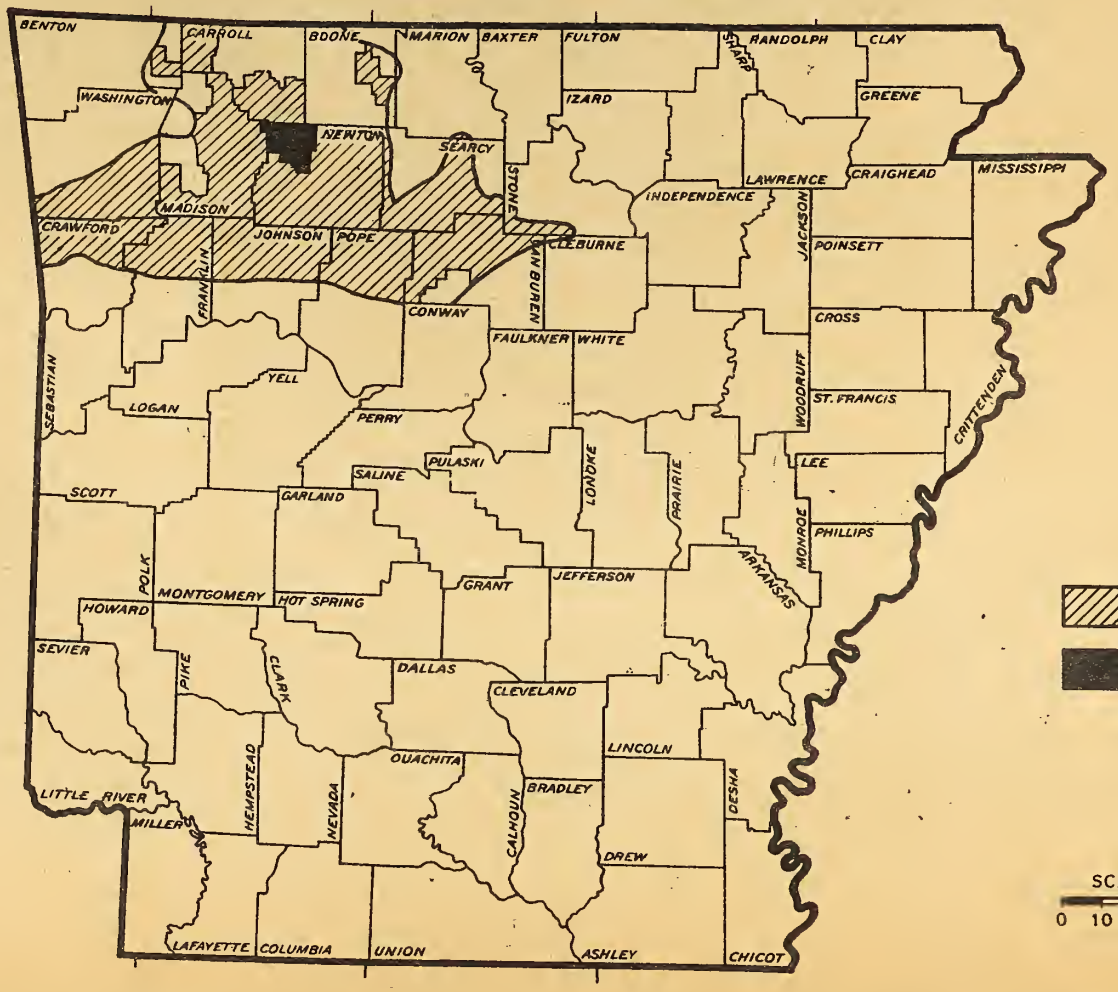

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FIGURE 1

and almost strict reliance upon the production of livestock and livestock products as a source of income. Approximately one-fifth of the land in farms is used for production of crops, and of the cropland harvested in 1939, 90 percent was devoted to production of feeds. Hay crops accounted for 45 percent of the cropland harvested, corn 30 percent, and other feed crops 15 percent. Cash crops are limited almost entirely to fruits and canning vegetables, and production of these specialty crops is restricted to small localities which generally are adjacent to the surrounding crop specialty areas. Production of cotton in this area has always been a comparatively minor enterprise from the standpoint of its contribution to the agricultural income of the area as a whole. Moreover, cotton has been decreasing in importance since 1925, and accounted for only 1 percent of the cropland harvested in 1939. Livestock enterprises include beef cattle, dairy cattle, sheep, goats, swine, and poultry. However, "general purpose cows" and "range hogs" are perhaps the most important enterprises for the area as a whole.

The area is predominantly mountainous, with shallow and stony soils which are, in the main, unsuitable for agricultural purposes other than those of a highly extensive nature. Between mountain ranges occur interspersed prairies, glades, and alluvial terraces which are level to gently rolling and that have comparatively deep and fertile soils. Although farming in these more fertile parts conforms closely to the feed crop-livestock system typical of the area as a whole, the superior land resources have encouraged a more intensive utilization and a considerably more commercialized agriculture than is characteristic of the strictly mountainous parts with which this report is primarily concerned.

The rent-free use of the large extent of cut-over and unoccupied land in this area holds a vital relationship to farm operation in many localities, including the locality studied. The occurrence of this type of land, which is referred to as "open range", is limited chiefly to the more mountainous parts and accounts for about 40 percent of the total land in five representative counties. It should be noted that of the estimated 939,000 acres of open range in these five counties, approximately 209,600 are owned by the United States Forest Service.

Method and Scope of Study

The locality selected for study consists of the four civil townships lying in the northwestern corner of Newton County. The quality of the land resources and the uses to which they are put is believed to be typical of the remainder of the mountainous parts of the Western Ozark Mountain Area. The primary source of data was developed by the survey method in the spring of 1941. A total of 30 farmers, selected from a list of prospective informants which was prepared by canvassing rural post offices and merchants, were interviewed in the vicinity of Compton, Ark. An attempt was made to limit prospective informants to those who had lived in the area for several years and were reasonably well-informed, were bona fide farmers rather than part-time farmers and lumber

Table 1.- Land and livestock organization of typical Western Ozark Mountain Area counties, Arkansas, 1940

Item	Boone County	Carroll County	Madison County	Newton County	Searcy County	5-County average
	Acres	Acres	Acres	Acres	Acres	Acres
Average acreage per farm	124	125	114	89	105	113
	Percent	Percent	Percent	Percent	Percent	Percent
Proportion of land area in farms:	71	76	62	33	48	58
Proportion of farm land used for:						
Crops	16	16	18	17	18	17
Idle and crop failure	4	2	4	3	3	3
Pasture, plowable and other	41	39	15	16	14	26
Woodland	36	40	43	62	57	47
Other land in farms	3	3	15	2	8	7
Proportion of cropland harvested that was used for:						
Corn	21	25	31	42	36	30
Small grains harvested	11	11	8	5	9	9
Oats cut and fed unthreshed	7	2	9	8	4	6
All hay	51	57	41	36	35	45
Cotton	1	-	-	1	4	1
	Number	Number	Number	Number	Number	Number
Number of livestock per 100 acres farm land:						
All cattle	6.8	6.5	4.4	5.3	5.2	5.7
Cows milked	2.5	2.7	1.8	2.1	2.0	2.2
Sheep	2.0	4.8	2.9	2.6	.7	2.8
Swine	2.2	3.3	4.2	7.4	4.8	4.1
Poultry	30.8	33.8	34.3	30.2	29.3	32.1
Goats (all kinds)	1.6	3.7	2.4	2.5	1.2	2.4

Adapted from 1940 census.

workers, and were either at present or in recent years owners of milk goats. From each of these 30 informants, information was obtained concerning production practices and expenses for one or more farm enterprises. A farm business schedule was completed for each of 20 farms, covering in detail production, receipts, and expenses for the year 1940.

Table 2.- Comparison of land use on sample farms with the sample area and five counties, Western Ozark Mountain Area, Arkansas, 1940 1/

Item	Sample farms	Sample area 2/	Newton County	5 Ozark Counties
	Percent	Percent	Percent	Percent
Total land in farms	100	100	100	100
Woodland	67	72	62	47
Cleared pasture	18	9	16	26
Cropland	13	17	20	20
	Acres	Acres	Acres	Acres
Nonfarm open range	--	39,462	343,122	938,994
Open range per acre farm land	--	1.65	1.99	.73

1/ Based on 1940 census and field data.
2/ The sample area consisted of Plumlee, Ponca, Low Gap, and Osage townships in Newton County.

FARM ORGANIZATION, OPERATION, AND EARNINGS IN 1940

The material presented in this part of the report is primarily descriptive in character and is limited to information obtained from 20 farmers covering their farm business for the year 1940. All of these farmers owned their farms and had operated them the 2 preceding years or longer. Although considerable effort was made to limit the cases selected for study to bona fide farmers, the absence of any good criteria made for considerable latitude in judging whether a tract of land occupied by a family, particularly one with no established source of nonfarm income, may properly be regarded as a farm. Each of these 20 farmers obtained a substantial part of his livelihood from enterprises directly associated with his tract of land.

Farm Organization and Operation

Because of the obvious shortcomings connected with ascribing values to the various items that make up the inventory of farms of this kind, only passing consideration will be given the financial aspects of farm organization. More thorough consideration is given to the use that is made of the physical resources comprising the farm plant.

Size of farm and use of land.- The acreage in a farm in the Western Ozark Mountain Area is a poor measure of the magnitude of the farm business unless the use of the land is taken into account. The farms studied varied from 20 to 241 acres in size, the average being 123 acres. Yet two-thirds of the total land included in these farms was occupied by cut-over timber and 72 percent of the cut-over acreage was not under fence. In general, this land has been depleted of saw timber and current production consists largely of fuel wood, fence posts and rails, and limited grazing. Technically, cut-over land represents a distinct use, but it is little or no different from the adjacent cut-over land in nonfarm ownership and, as such, it is of no particular advantage to the operator except that it gives him an opportunity to establish a livestock enclosure. Ready access to the large extent of open range provides the farmer who has a small acreage with grazing land and wood comparable to that provided by the undeveloped land in the private ownership of the larger farms. Thus, the size of farms can best be considered in terms of the acreage used for crop production and improved pasture, for these items are more logically associated with the kinds and numbers of livestock kept, and consequently, with the income earned.

Lack of cropland for production of feed and limited acreages of open pasture are offset, within broad limits, by greater than usual use of open range and lower than usual feeding rates. Accordingly, the use of open range is a factor to be considered in the organization and scale of farm operations. On the basis of estimates made by 20 farmers, the number of livestock they kept in 1940 was considerably in excess of the number that could have been kept if grazing had been confined to the open pasture and cut-over land actually owned or controlled by these farmers (table 3).

Table 3.- Use of open range in 1940, average of 20 farms, Western Ozark Mountain Area of Arkansas 1/

Item	Kind of livestock			
	Cattle	Sheep	Goats	Swine
	Percent	Percent	Percent	Percent
Percentage of grazing time spent on open range during 1940	62	60	90	81
Percentage of 1940 numbers that would be kept without use of open range	65	38	73	40

1/ Based on farmers' estimates.

The acreage devoted to crops is governed chiefly by the character of the soil. The topsoil is generally very shallow and most of the cultivated fields are subject to severe erosion which quickly exposes the underlying rock. The rock must be removed periodically to permit cultivation, "rock harvests" becoming more frequent as erosion progresses. After large and immovable rocks are exposed, the fields revert to pasture and new land is cleared for cultivation. Hence, the acreage of pasture is somwehat related to the number of years the farm has been operated, as well as to the character of the soil and the topographic features. Little of the acreage now in pasture was cleared and developed specifically for that use but instead represents "worn out" cropland. "Old" farms do not necessarily have a large acreage of open pasture, however, as woody growth responds rapidly on undisturbed areas. Also, a large percentage

LAND AND LIVESTOCK ORGANIZATION OF 20 FARMS, WESTERN OZARK MOUNTAIN AREA, 1940

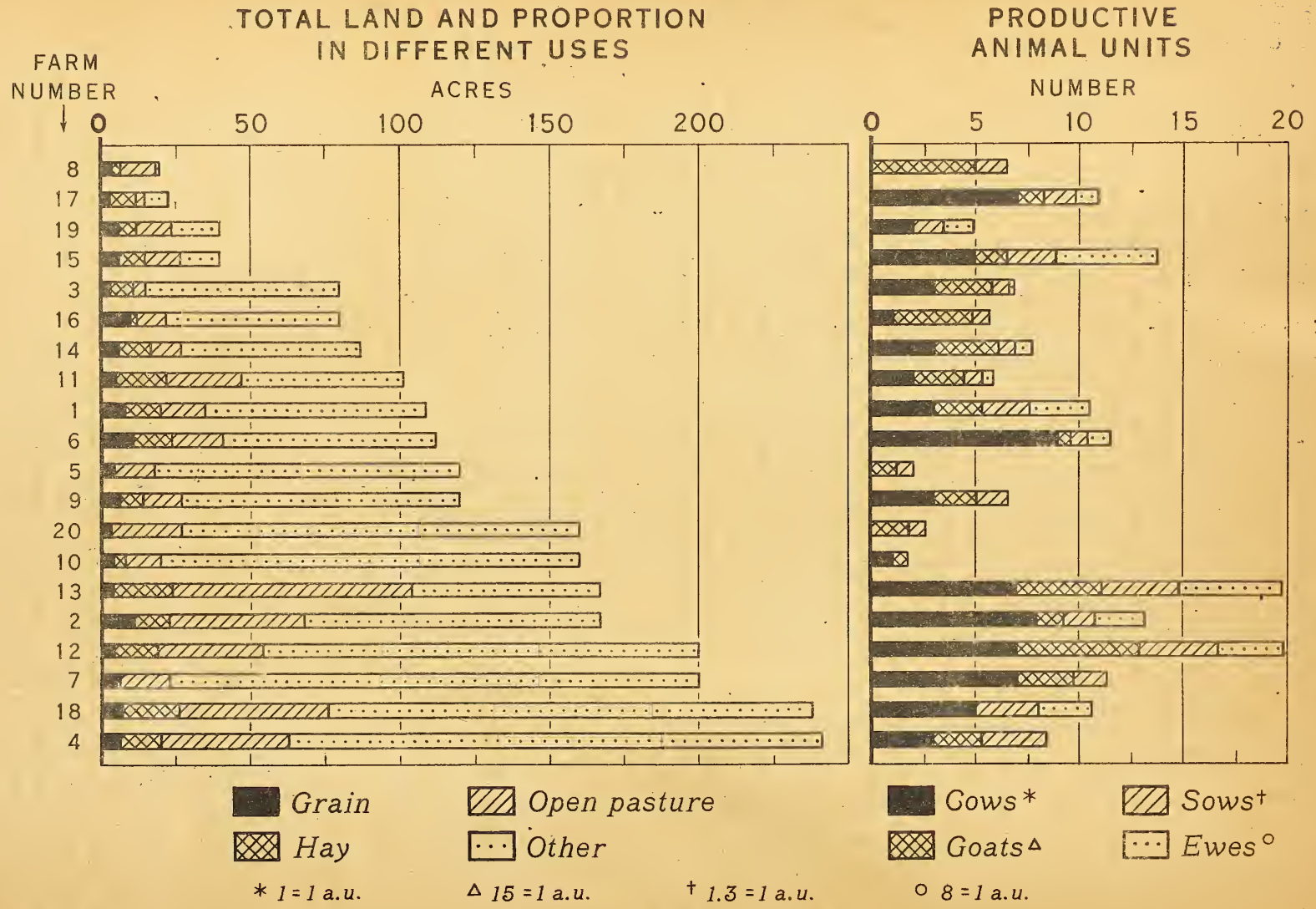

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FIGURE 2

of the land lies on slopes which are too steep to cultivate, thus limiting the opportunity to develop "new land" on many farms.

Cropland organization and production.- Field crops are limited almost entirely to corn and various hay crops, of which lespedeza is the most important. Because of its erosion-inducing characteristics, production of corn is usually limited to the farmer's minimum needs for grain, and is restricted to the most favorable sites. Although all of these farms grew as much as 3 acres of corn in 1940, 15 of them grew no more than 6 acres and only 2 grew as much as 11 acres. Corn requires considerable labor, but represents a fairly dependable feed crop. Most farmers reported a usual yield of 18 to 25 bushels per acre and the average yield in 1940 was 20 bushels per acre. Corn is extensively used for fodder, particularly in years when forage crops are short of expectations. Eight of the farms put up corn fodder in 1940, but only in small quantities.

As erosion is minimized, close-growing hay crops can be produced with considerably less labor than is required for corn, particularly the labor associated with the removal of rocks. Lespedeza is the most common hay crop. It requires practically no attention other than cutting, and yields of from three-fourths to one and one-half tons of hay per acre are common. After the original seeding, fields sown to lespedeza are ordinarily allowed to produce two or three crops with no cultivation and only light overseedings each spring. Eight of the farms grew small acreages of spring-sown oats which were harvested, unripened, for hay.

The total acreage devoted to crops varied widely between farms, ranging from as little as 4 acres to as much as 28 acres. The farms with the larger acreages of cropland devoted a proportionately larger area to hay crops.

Kinds and numbers of livestock.- The different kinds of livestock enterprises commonly found in this area compete to a limited extent only in their production requirements. Although all kinds of livestock are fed meagerly, the feeding practices are flexible, and production depends chiefly upon grazing, a considerable part of which is obtained from open range. Hence, the kind and number of livestock kept by farmers depends to a considerable degree upon personal inclinations and initiative.

All of the farmers kept work stock and most of them had a team. Although field operations are on such a small scale as to utilize work stock very poorly, most farmers rely upon these animals as their principal means of transportation.

All of the farms kept either cattle or milk goats, or both, the numbers varying from the minimum needed to supply dairy products for home use to commercial enterprises of considerable size. Eighteen of the farms kept milk goats and 3 relied upon them entirely to furnish dairy products used in the home and for sale. The number of goats kept varied from as few as 10 to as many as 90; the average herd had 38, about three-fourths of which were actually milked. There were an average of 4 cows per farm on the 17 farms keeping cattle. Two of these farms had only 1 cow, 11 of them kept from 3 to 7 cows, and the farm with the largest number kept only 9 head.

The hog enterprise is complementary to dairying on most farms. Although all 20 of the farms kept hogs in 1940, those which produced dairy products primarily for home use also produced pork primarily for home use. On the other hand, farms producing commercial quantities of dairy products also produced pork on a commercial scale. As there is no market outlet for whole milk, a considerable quantity of skim milk is produced during the summer months when the production of milk is at its peak. Range hogs, which ordinarily require considerable supplemental feeding during the summer, afford a lucrative means for disposing of the dairy byproduct and most of the farmers have recognized this.

Only 12 of the 20 farms kept sheep in 1940, and 2 of these kept fewer than 5 head. Four farms kept from 5 to 15 head, and the remainder had flocks of more than 20 sheep, the largest flock consisting of 40 head. As is discussed later, the requirements for successfully handling sheep are more rigid than for other livestock, and hence they are less popular as an enterprise.

Poultry are produced primarily for home use. Each of the 20 farms kept a flock of chickens, but only 2 kept more than 50 hens and 9 farms had fewer than 35 hens. The subsistence character of the enterprise is indicated by the fact that in 1940 only 8 of the farms had surplus eggs to sell during the summer and only 5 sold fryers. The quantities sold were small.

Equipment and improvements.- Ordinarily farming operations require little equipment. Planting in most cases is done by hand. Turning plows, double-shovels, and single-stocks are the usual plow tools. A home-made V-type harrow and brush or log drags complete the inventory of horse-drawn field equipment on most farms except for haying equipment. Ten of the farms had mowing machines and hay rakes. All of the farms had at least one wagon. On the basis of estimates made by the farmers, the horse-drawn equipment on the average farm could be replaced new for an outlay of $175.

The separation of butterfat in goat's milk cannot be done effectively by gravity but requires the use of a centrifugal separator. All of the farms had this equipment, representing initial investments of from $35 to over $100. Moreover, depreciation and repairs on the separator and cream cans represent a much higher proportion of the original investment than is the case with field equipment which is used indefinitely with only home repairs. The average initial investment in dairy equipment was $56 and annual repairs and replacements averaged almost $8 per farm.

Stock water facilities, fences, and farm buildings are about as unpretentious as the outlay for farming tools. Springs and creeks are usually relied upon for stock water. Hand-dug wells and springs furnish domestic water and in a few cases wells are used as a supplemental source of stock water. The average farm has about 2 miles of fences, the greater part of which is rail fence. Wire fencing is generally limited to small enclosures. The usual farm building inventory consists of a small barn, and one or two sheds, all made of poles or rough lumber.

Production and Earnings

Scale of production.- Because of the variation in rates of production with differing practices and in choice of enterprises, the scale of farming operations is more clearly revealed by the volume of output than by the physical organization of the farm plant. The volume of production, although small in every case varied from the bare necessities for subsistence, as in the case of farm 10, to comparatively large salable surpluses of livestock and livestock products (table 4).

A noteworthy feature of these farms is that in every case rather large quantities of food products were grown specifically for the home, and substantial quantities were preserved for year-round use. As contrasted with low-income farmers in many other areas, these farmers are well supplied with home-grown foods. The average family, consisting of two adults and three other persons, preserved 254 quarts of food, principally vegetables and fruits, and produced 13 bushels of potatoes and 186 pounds of other nonperishable truck crops which could be stored for year-round use. In addition, the garden furnished fresh vegetables during half the year. Average quantities of livestock and livestock products consumed per farm were as follows: 620 pounds (live weight) of meat, about half of which was pork; 153 dozen eggs; 315 gallons of whole milk; and 140 pounds of butter. An average of 13 cords of firewood was used in the home.

Cash receipts.- Cash receipts from products sold off these 20 farms during 1940 averaged $300 per farm, varying from as little as $30 to almost $800 (table 5). Only 2 farms had cash receipts of less than $100, while 14 farms had cash receipts of more than $350, 2 of which exceeded $500. The greater portion of the cash income of these farms was derived from the sale of various kinds of livestock and livestock products. Receipts from the sale of butterfat represented the most important single source of cash income, accounting for more than one-third of the total receipts on 9 farms and more than half the total receipts on 4 farms. All of the farms except one sold either pork or beef, or both, and 35 percent of the total cash income received by the 20 farms came from the sale of these two products.

Seven farmers sold forest products, principally hand-hewn ties and cordwood. Only one sold saw timber and his receipts from it amounted to $95. Receipts from the sale of forest products varied from $8 to $39 on the other 6 farms.

Receipts from other sources were primarily accounted for by Agricultural Adjustment Administration payments. Eleven of the farms participated in the 1940 AAA program earning payments that averaged $20 a farm and varied from $6 to $29.

Noncash income.- Any value placed on the farm contributions to the family living is subject to differences of opinion. This is particularly true with regard to those products for which there is no market alternative and those which circumstances indicate would not be bought and used in comparable quantities at prevailing market prices. For those items to which values were assigned.

Table 4.- Production of livestock and crops, 20 farms, Western Ozark Mountain Area, Arkansas, 1940

Farm number	Livestock (net production)					Livestock products			Field crops		Fruits and vegetables 2/		
	Beef	Pork	Mutton	Goats	Chickens	Milk	Eggs	Wool	Corn	Hay 1/	Canned	Potatoes	Other
	Pounds	Pounds	Pounds	Number	Number	Gallons	Dozen	Pounds	Bushels	Tons	Quarts	Bushels	Pounds
1	900	1,160	1,050	16	75	1,980	250	99	110	15.0	140	7	0
2	1,450	2,735	400	6	45	2,020	150	28	150	12.2	270	8	100
3	1,200	710	160	20	50	1,125	120	10	50	5.0	400	12	240
4	1,050	3,080	0	38	50	2,100	200	0	200	12.0	500	8	200
5	0	780	0	6	50	591	150	0	150	1.0	250	6	150
6	2,625	790	810	9	85	1,930	240	51	245	12.0	445	16	300
7	60	1,290	0	13	60	2,245	300	0	44	2.0	300	12	400
8	0	1,000	0	12	48	1,715	150	0	60	2.2	30	20	200
9	500	1,040	0	30	30	1,460	200	0	110	4.0	150	4	300
10	400	250	0	10	36	585	80	0	115	8.5	230	15	200
11	570	1,140	270	9	75	2,105	250	20	100	15.5	275	18	250
12	1,100	1,875	1,260	46	50	2,235	200	75	110	16.0	200	13	180
13	400	1,065	1,680	17	50	1,934	250	148	80	15.4	254	5	130
14	625	730	590	19	45	2,531	150	37	90	10.8	150	25	0
15	1,675	1,510	2,160	9	50	1,006	165	130	120	10.0	350	18	200
16	350	510	0	46	60	2,010	200	0	175	2.2	200	22	120
17	2,400	1,220	425	0	50	1,270	100	33	45	8.0	90	15	340
18	570	1,840	1,260	0	30	385	180	95	115	14.5	500	18	0
19	300	200	960	0	70	565	122	50	120	4.0	240	10	400
20	0	380	0	1	30	705	30	0	40	.3	100	15	0
Average	809	1,165	551	16	32	1,525	174	39	111	8.5	254	13	186

1/ Includes corn fodder.
2/ Fruits and vegetables for home use. Canned foods include wild berries, etc.
"Other" includes cabbage and other nonperishable truck.
In addition to these items, fresh vegetables were available on an average of 180 days per farm.

conservative prices were used. 1/ Even on this basis the farm contribution to the family living averaged almost $200 per farm. Slightly more than 50 percent of the value of the products used in the home was ascribed to the livestock and livestock products which were consumed fresh or were preserved.

Cash expenses.- The total cash outlay for farm operation and maintenance averaged slightly more than $106 per farm in 1940, including the capital invested in livestock (table 5). Actual cash expenses, exclusive of livestock purchases, averaged only $70 per farm. Ten of the farms spent an average of $73 for livestock. However, expenditures of this type reflected trading operations in most cases, and were offset by livestock sales and inventory gains.

The various other expenditures associated with livestock enterprises averaged $23 per farm. Feed purchases accounted for the greater part of this, averaging $19 per farm. Expenditures for feed were perhaps somewhat larger in 1940 than is normally the case because of the unusual amount of snow in the spring. In every case, feed purchases were limited to concentrates. Veterinary services and purchase of medicines and vaccines accounted for an average expenditure of $3.65 for the 20 farms, although only 2 of the farms reported the use of a veterinarian's services.

The purchase of seed and miscellaneous farm supplies resulted in an average expenditure of $19 a farm. Purchases of seed (primarily for the garden) and canning supplies accounted for a little more than half of this amount. Expenses for repairing and replacing farm equipment and buildings averaged $17 per farm. Most of this expense resulted from the purchase of materials, as most of the farm-repair work is done by the operator and his family. Taxes, which are based on small millage rates and low property valuations, averaged only $10 per farm, or about 9 cents per acre of farm land.

Net income.- Although the total cash outlay for operating these 20 farms was small in every case, cash receipts exceeded cash expenditures by only $194 on the average farm in 1940. Moreover, 5 farms earned a net cash income of less than $35 and only 1 farm earned a net cash income of more than $500. More than half of the total net farm returns to the average family for its labor and investment were represented by the noncash contribution of the farm to the family living.

1/ Prices for products used in the home were as follows: Milk 7½¢ per gallon, butter 20¢ per pound, canned foods 10¢ per quart, potatoes $1.25 per cwt., other nonperishable truck crops $1 per cwt., fresh vegetables 10¢ per day, and fuel wood 50¢ per rick. The value assigned to meats and eggs used in the home was based on the price the farmer received in selling these products.

Table 5.- Income and expenses, 20 farms, Western Ozark Mountain Area, Arkansas, 1940

Section. A.- Income from principal sources and gross farm income

Farm number	Cash receipts from sale of: Pork	Beef	Other livestock	Butterfat	Other livestock products	Forest products	Other cash income	Total cash receipts	Value of farm products used in home	Net change in inventory	Gross farm income
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1	81	15	77	87	30	0	9	299	165	125	589
2	92	92	467	80	14	8	26	779	190	6	977
3	35	90	185	30	6	25	15	386	190	-207	369
4	140	0	50	108	8	0	36	342	280	131	753
5	40	0	22	0	0	95	0	157	180	6	343
6	46	50	78	124	26	10	32	366	200	186	752
7	60	5	45	151	22	39	0	322	185	58	565
8	24	0	28	77	0	0	0	129	175	17	321
9	51	45	120	70	0	0	14	300	165	-13	452
10	0	0	0	0	0	30	0	30	180	47	257
11	58	45	30	132	5	8	18	296	200	146	642
12	118	81	155	108	15	0	29	506	250	-38	718
13	42	125	79	75	37	0	19	377	240	-50	567
14	0	85	23	135	10	0	0	253	255	175	683
15	80	137	166	0	38	0	0	421	260	-19	662
16	36	0	0	134	0	0	0	170	205	82	457
17	76	135	25	60	8	0	0	304	165	17	486
18	100	45	168	0	16	0	40	369	185	-77	477
19	27	27	66	0	14	0	6	140	180	150	470
20	15	0	0	37	0	0	0	52	105	-73	84
Average	56	49	89	71	12	11	12	300	198	33	531

Table 5 (continued).- Income and expenses, 20 farms, Western Ozark Mountain Area, Arkansas, 1940

Section B.- Expenses and income summaries

Farm number	Cash expenses for: Livestock purchased	Feed purchased	Veterinary and medicine	Seed and supplies	Equipment and buildings	Taxes paid	Total cash expenses	Net cash income	Net farm income	Off-farm income	Family income
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1	7	26	2	22	16	6	79	220	510	75	585
2	200	8	8	23	12	15	266	513	711	125	836
3	0	10	1	37	26	4	78	308	291	15	306
4	0	25	5	26	69	17	142	200	611	0	611
5	0	2	5	16	18	5	46	111	297	50	347
6	0	42	4	28	18	10	102	264	650	0	650
7	0	16	3	10	6	14	49	273	516	0	516
8	25	33	1	14	21	5	99	30	222	150	372
9	50	49	4	7	18	7	135	165	317	50	367
10	4	2	2	8	5	5	26	4	231	100	331
11	115	18	5	14	6	6	164	132	478	30	508
12	0	46	5	36	29	22	138	368	580	0	580
13	0	4	3	26	15	18	66	311	501	0	501
14	151	18	4	13	25	12	223	30	460	0	460
15	45	18	9	11	9	15	107	314	555	0	555
16	0	13	3	15	13	8	52	118	405	200	605
17	30	44	3	16	6	4	103	201	383	0	383
18	0	1	5	27	20	18	71	298	406	0	406
19	105	2	0	31	4	6	148	-8	322	60	382
20	0	1	1	12	3	12	29	23	55	75	130
Average	37	19	4	19	17	10	106	194	425	47	472

Eleven of the farmers found and availed themselves of opportunities to add to their incomes by off-farm labor. All but 2 of these 11 farmers had lower than average net farm incomes. The principal source of outside income was from timber operations of various kinds. Two farmers did mining work, and the construction of an electric power transmission line provided a few days of labor for 5 of the men.

As a general rule, timber work affords a rather constant opportunity for farmers to supplement their farm earnings. Timber work in this locality is usually of the type promoted by operators of small portable mills who depend upon cheap labor and low-cost cull timber.

Although these 20 farms made extensive use of their production facilities in 1940, this resulted in a low volume of production as well as low operating costs. All of the crops produced were consumed on the farm and in the home, livestock enterprises furnishing the only salable surpluses, as well as contributing substantially to the family living. Because of the varied choice of livestock enterprises and differences in the handling practices, this important aspect of the farm business is later discussed in detail.

LIVESTOCK PRACTICES AND PRODUCTION RATES

The usual, or typical, requirements and production rates with respect to the four major livestock enterprises found on these farms are now considered. Because of the promising possibilities of the enterprise, milk goats are more fully discussed than are the other three -- cattle, sheep, and range hogs. The term "usual" is to be regarded as meaning practices which most of the farmers ordinarily follow, and expect to follow. Quantitative statements of usual production requirements and production rates are represented by the average of each appropriate item reported after eliminating any obvious abnormalities or extremes in the data.

The Milk Goat Enterprise

Background.- Throughout the Western Ozark Mountain Area common or American goats have been used for many years as a means of clearing brush in the development of pastures and for suppressing woody growth in improved pasture. A large proportion of the goats in the area at present are of this kind. Dairying with milk goats started about 20 years ago, when a farmer near Compton, Ark., began selecting milkers from his herd of "brushing" goats. Using a Toggenburg buck and by continuous selection, he soon developed a herd of milking goats that produced milk considerably in excess of his home needs. He found, too, that he could profitably sell cream on a butterfat basis and for the same prices as cream from cows.

The experience of this farmer encouraged others to follow his example and it is estimated that there are now more than 2,000 goats within a radius of 10 miles of Compton, which either are or could be milked. Most of the cream is sent to buyers at Harrison, Ark., an average distance of 25 miles. Transportation to Harrison is provided by rural mail carriers and cream-route operators whose charge for the service in 1940 and 1941 was about 2 cents per pound of butterfat.

Breeding practices.- The practice of breeding the goats to kid in the latter part of March and the early part of April is generally followed. The breeding buck is not allowed to run with the herd until late November, at which time milking is usually terminated. Keeping the buck separated from the herd is usually accomplished by tethering him out when a goat-proof enclosure is not available. Attempts at herd improvement through a breeding program are somewhat indiscriminate. Three breeds of milk goats have been introduced in this locality: Toggenburg, Saanen, and Nubian. The result of crossing first one and then another of these breeds on stock of common origin has resulted in herds of highly heterogeneous composition. Bucks are usually replaced each year as a high percentage of the does bring kids when they are yearlings. Buck replacements are usually obtained by trading with a neighbor, with little regard on the part of either for their predominating breeds. In every instance encountered in this study, only one buck was kept per goat herd, regardless of the number of does to be serviced. The explanation given is that the goats are on open range during breeding season and if one buck is not sufficient, the service of neighboring bucks can be relied upon. Although this system obviously has severe disadvantages with respect to herd improvement, its adequacy in other respects is substantiated by the fact that 90 to 100 percent of the does on hand in the spring, yearlings included, "find kids".

Milk production and feeding practices.- Production records for individual animals were unavailable. However, for each of 22 herds, it was possible to establish the total production of butterfat during 1940 on the basis of receipts from cream sales, and in 17 of these cases the creamery invoices were available. In these 22 herds a total of 674 goats were milked during 1940, producing an average of 24.4 pounds of butterfat or 71 gallons of 4 percent milk per doe milked. There was considerable variation in production rates between herds, the highest averaging 37.4 pounds of butterfat per doe and the lowest averaging 16.3 pounds per doe. The average milking season was 35 weeks, ranging from 31 to 40 weeks. However, 83 percent of the total production of the 22 herds occurred in the 6-month period, May through October, with May as the peak month.

Although the rates of milk production shown above are small they represent a high rate of production in terms of the quantity of feed involved. Compared with feeding standards for dairy cattle, the milk goats in this area are meagerly fed. In a majority of cases, goats are fed no grain or other concentrates, and hay is fed only during periods of exceptionally unfavorable winter weather, during the kidding period, and through the first few weeks of the milking season. Feeding at this last time is primarily a device for training the goats to appear for the evening milking. Lespedeza hay is the most common feed and is generally fed at the rate of 1 ton per each 20 to 30 goats.

Although 17 of the 22 herds were fed no grain or other concentrates, the 5 highest producing herds were fed an average of 30 pounds of grain and 15 pounds of cottonseed meal in addition to 90 pounds of legume hay per doe. The average production per doe milked in these 5 herds was 33 pounds of butterfat. In contrast, the 5 herds with the lowest production rates were fed an average of only 40 pounds of roughage per doe and produced an average of 18 pounds of butterfat per doe milked. Twelve of the 22 herds were fed from 70 to 100 pounds of legume hay per doe and rates of production varied from 20 to 26 pounds of butterfat.

Table 6.- Usual production and feeding rates per 10 head of milking goats, Western Ozark Mountain Area, Arkansas

Item	Unit	Usual	5 highest producing herds	5 lowest producing herds
Production:				
Butterfat	Pound	225	330	181
Kids raised	Number	7	7	7
Feed requirements:				
Grain fed	Pound	0	300	0
Cottonseed meal	do	0	150	0
Legume hay	do	800	900	300
Other roughage	do	0	0	100
Man labor	Hour	180	192	180
Cash expenses	Dollar	0.70	1.00	0.35

It is doubtful that feeding during the milking season would be profitable with present market outlets and normal prices of butterfat, but it is the consensus of the most successful goat raisers that does fed at least a maintenance ration during the late winter and spring have a substantially higher initial rate of production and maintain a higher level of production than the does that kid while in poor condition as the result of inadequate winter feed.

Although feeding rates were unquestionably of considerable importance in accounting for the variation in production, the breeding of the herds must also be taken into account. The five highest producing herds were composed of many highly bred individuals and were predominantly of three-fourths or higher Toggenburg and Saanen blood. On the other hand the five lowest producing herds were composed of a larger proportion of scrub stock, and were poorly fed. Since, as would be expected, the most highly bred herds are also the better fed and better cared-for herds, the data collected in this study provide no basis for conclusions as to the separate effects of either breeding or feeding on production of milk. Evidence developed by both the Bureau of Animal Industry of the United States Department of Agriculture and the New Mexico Agricultural Experiment Station from experimental work in breeding up herds of common does by use of purebred Toggenburg and Saanen bucks indicates that large increases in rates of milk production result from a herd-improvement program. 2/ Although the milk goat herds in this area have perhaps more than one-quarter blood of

2/ U.S.D.A. Farmers' Bulletin No. 920, Milk Goats, July 1937. New Mexico Agricultural Experiment Station Bulletin No. 154, Milk Goat Improvement, May 1926.

milking breeds, it is highly probable that the adoption of a sound herd-improvement program would substantially increase production rates. Although improved breeding practices are difficult to reconcile with present methods of using the open range, some of the difficulties could be overcome through co-operative effort.

Pasture requirements.- During the kidding period, a matter of 15 to 45 days, the goats are usually kept in an enclosed pasture. For the remainder of the year they feed on open range, deriving some nutriment from mast during the fall and winter. It is claimed that goats prefer browse to native grasses and that they are discriminating in the type of browse they relish.

The consensus of the goat raisers interviewed is that if goats are confined to cut-over land at the rate of one goat per acre, they will be so starved that their feeding will kill all underbrush and soft-barked trees within 3 years, and at the expense of most of the milk production. At the other extreme, the general opinion is that cut-over land of the same kind can be stocked indefinitely at the rate of 1 goat to each 10 to 15 acres without causing a material change in the pattern of vegetative specie.

Most farmers prefer that the goats destroy as much woody vegetation as possible in the vicinity of the farmstead, thus encouraging the growth of grass and providing better range for cattle and sheep. In several cases farmers reported that they make a practice of felling small trees over an acre or two each year which the goats strip and keep sprouted off.

Miscellaneous handling practices and problems.- Goats are highly prolific. Farmers reported that 95 percent of the does on hand at kidding time, yearling does included, bring kids. Moreover, about half of them bring twins and a few bring triplets. Because of the generally lax handling methods, however, death losses are high and most farmers expect to save no more than one kid per doe.

Goats bring a very low price in this area and farmers generally are obliged to sell at prices for ordinary "brushing goats". Prices range from $1 to $5 a head and provide no real incentive for minimizing death losses as the local demand is limited, even at these prices. Hence, most farmers destroy or give away the male kids.

The doe kids are usually hand-fed, principally on skim milk after the first 10 days, for a period of 6 to 8 weeks, and are never allowed to nurse. They are then turned out with the milking herd to forage on open range. Enough survive to increase the size of the herds by 10 to 20 percent annually, above replacements.

Winter death losses among all of the goats on hand usually average about 10 percent. Few farmers cull their herds systematically, but allow them to increase, milking only the better producing individuals, until the herd reaches unmanageable proportions. They then "sell down" to a "starting" herd.

Other than malnutrition, the principal source of death losses are related to various types of parasitic infestation. Stomach worms are common in goat herds of this area and directly or indirectly they take a heavy toll. Most goat raisers recognize the malady but for different reasons are inclined

to allow their herds to become badly infested before taking corrective steps. The usual remedy is a drench consisting of a 1 percent solution of copper sulfate to which nicotine sulfate has been added at the rate of 1 oz. per gallon of solution. It is administered one to six times a year, depending upon the inclination of the operator and to some extent upon the severity of the infestations. Lice are also common. The usual remedy consists of spraying or otherwise applying stock dip. The average cost reported for these remedies in 1940 was 3 cents a head for drenching (four applications) and 4 cents a head for lice control.

Other Livestock Enterprises

Cattle.- Largely because of the flexibility of the enterprise, the "general purpose" cow is an important feature of most farm organizations in the Western Ozark Mountain Area. With market outlets for dairy products none too well developed and with comparatively high transportation costs, most mountain farmers find it more profitable to raise beef than to produce milk or butterfat commercially, except when prices of dairy products are high.

Breeds of cattle vary from strictly dairy types to strictly beef types, but most of the stock is a nondescript cross between these two types, with the beef type predominating in the larger herds. Farms with 1 or 2 cows generally keep cattle of predominantly dairy breeding and use beef type sires.

Of the 19 cases studied all of the cows that freshened in 1940 were milked at some time during the year, but the quantity of milk taken and the quantity of beef produced varied considerably between farms. Farmers generally took as much milk as was needed for home use and allowed the calves to have the remainder. Farms with only one or two fresh cows vealed the calves at 6 to 10 weeks of age, releasing the total milk production for home use for the remainder of the lactation period. Farms with more cows took proportionately less milk and raised the calves to heavier weights.

Table 7.- Usual production, feeding practices, and labor requirements for general purpose cattle, Western Ozark Mountain Area, Ark.

Item	Unit	Usual	Extremes in milk vs. beef production	
Milk	Gallon	200	380	50
Beef	Pound	235	125	270
Feeding rates:				
Corn (shelled equivalent)	Pound	250	300	100
Purchased concentrates	do	150	200	--
Roughage	do	1,500	1,600	300
Pasturage:				
Enclosed pasture	Days	145	175	125
Open range	do	220	190	240
Man labor	Hour	115	130	90
Cash expenses:				
Feed purchased	Dollar	2.25	3.00	--
Other	do	1.00	1.00	1.00

In general, cattle are less able than milk goats to utilize open range effectively. Most farmers give cattle first choice of pasturage available, and this is usually adequate for approximately 20 weeks during the spring and summer months. Cattle perhaps get some nutriment from mast, but supplemental feeding is generally practiced throughout the winter and spring. Feeding rates, however, represent scarcely more than the requirements for maintenance.

Sheep.- The sheep enterprise, more than any other livestock enterprise, depends upon skilful management for successful operation under conditions found in the Western Ozark Mountain Area. Most of the interviewed farmers had at times owned sheep. Those without sheep in 1940 were generally agreed that the returns from sheep are not commensurate with the trouble and costs involved. On the other hand, most of the farmers with sheep were convinced that they were rather profitable. Probably if there are not facilities for handling sheep and sufficient feed, excessive death losses do render the enterprise unprofitable.

Sheep seemingly are incapable of successfully withstanding the cold wet weather of the winter when turned out on the open range. Hence, if high death losses are to be prevented, shelter and supplemental feed must be provided during the winter and during lambing season, which is usually concluded by the end of March. Like cattle, the sheep depend more on grasses than on browse. Most of the farmers who were keeping sheep kept them on open pasture 4 or 5 months of the year. Stomach worm infestations are common among sheep and to minimize pasture contamination, the sheep are usually grazed alternately on pasture and open range for periods varying from a few weeks to several months, depending chiefly upon the adequacy of the pasture. Frequent drenchings with copper sulfate solution are also employed by the more successful sheep raisers and effective control of worms is generally regarded as being as essential as are winter feed and shelter.

Breeds of sheep are mixed because of the general practice of trading rams between neighbors. However, at various times purebred mutton-type rams have been brought into the area, as evidenced by the markings of most flocks. The flocks are usually closely culled in the fall but death losses are high. Farmers reported that they usually replaced their flocks at a rate of 15 to 25 percent annually and that light culling usually meant an offsetting increase in death losses. Replacements of breeding ewes are generally obtained by holding part of the lamb crop.

The sheep are usually shorn only once a year. The amount of wool shorn per ewe is generally small, as mutton-type breeds predominate and because the sheep are none too well cared for at best. Lack of feed is partially responsible for the low mutton production rates. However, March lambs are usually disposed of by the early part of August and hence have not attained their potential growth.

Table 8.- Usual production, feeding practices, and labor for one ewe, Western Ozark Mountain Area, Arkansas

Item	Unit	Amount
Production:		
Mutton	Pound	68
Wool	do	4.5
Feeding rates:		
Grain	Pound	75
Hay	do	140
Pasturage:		
Enclosed pasture	Day	120
Open range	do	240
Man labor	Hour	8
Cash expenses:		
Miscellaneous	Dollar	0.10

Range hogs.- Range hogs are the most widespread, as well as the most frequently mentioned, farm enterprise of the Western Ozark Mountain Area, although the prevalence of "razorbacks" is perhaps exaggerated. Breeding up of stock is as ineffective in the case of hogs as it is with respect to any other stock under open-range conditions. However, much well-bred stock can be found in the area. The razorback appearance is probably caused more by malnutrition than by lack of breeding. Mainly because of the limited quantity of feed available, pigs are generally sold at light weights and the amount of pork produced per sow is largely governed by the mast crop. The spring litter accounts for most of the production, and the pigs are usually sold before weaning at ages varying from 3 to 6 months and at weights varying from 40 to 80 pounds. As the sows are generally in poor condition throughout the summer, they frequently fail to bring fall litters. The few pigs that are farrowed in the fall are carried through the winter on mast, with little or no supplemental feed, and are marketed by March, generally at heavier weights than is the case with the spring litter.

Table 9.- Usual production, feeding rates, and labor per sow, Western Ozark Mountain Area, Arkansas

Item	Unit	Amount
Production	Pounds pork 1/	560 1/
Feeding rates:		
Corn (shelled equivalent)	Pound	840
Wheat shorts	do	150
Skim milk	Gallon	375
Pasturage:		
Open range	--	year-round
Man labor	Hour	80
Cash expenses	Dollar	0

1/ 1.5 litters; 9 pigs saved out of 12 born.

Feeding practices are chiefly for maintenance purposes. During the winter the hogs are generally "located" once or twice a week and are "tolled" into the farmstead by throwing them an occasional ear of corn. By farrowing time, mast becomes scarce and the sow is usually fed small quantities of corn until skim milk becomes available. The milk then constitutes the bulk of the hog feed until the next mast falls. Most farmers make a practice of feeding wheat or corn shorts along with the skim milk for two to four weeks before selling the spring pigs which are usually disposed of by midsummer. Most of the corn fed to hogs is reserved for the two or three meat hogs. These are generally confined for a period of 2 weeks to a month before being killed and are fed all the slop that is available and about 10 bushels of corn. By and large, the hog enterprise is chiefly dependent upon mast for profitable operation, but the consensus of the farmers was that, as a general rule, pork could be most profitably produced in conjunction with the dairy enterprise as a means of utilizing the skim milk byproduct.

Without exception, the hogs were given no cholera immunization and only one of the farmers made a practice of treating his hogs for worms. There was a general agreement that the hogs were worm-infected but that treatment was an expense which would not be justified with present handling practices.

In this discussion of production requirements and rates, quantitative statements describing the usual practices have been given. It is emphasized that these input and output items are flexible and that wide variations were noted in both feeding rates and production rates for each kind of livestock. However, the input-output factors that have been described for each kind of livestock are adequate standards for the comparison of different livestock enterprises.

A COMPARISON OF LIVESTOCK ENTERPRISES

In ascertaining how well or how poorly an enterprise fits into the organization of a farm and the possibilities for realizing a profit, the probable net returns per unit should be considered. Equally important is a consideration of the circumstances that will probably limit, or permit maximizing, the total net returns. Among the more important of these are such factors as the need, and the availability of cash for operating expenses, the adequacy of available labor and skills, and, in the case of livestock enterprises, the availability of suitable pasture, feed, and handling facilities.

It is appropriate therefore to review some of the characteristics of the kind of farms with which this report deals. These characteristics may be briefly summarized as follows: (1) The character of the land is such as to limit sharply the opportunities for producing feed, particularly grain; (2) improved, or cleared, pastures consist mainly of worn-out cropland, are limited in extent, and are generally inadequate for year-round use; (3) most farms have ample family labor for unskilled tasks, or "chores"; and (4) the large extent of unoccupied cut-over land in the area provides a source of low grade grazing.

Table 10.- Ratio of returns to farm-grown feed and to family labor with different kinds of livestock, Western Ozark Mountain Area, Arkansas

Input items	Net returns per unit of input 1/			
	Milk goats	Cows	Hogs	Sheep
	Dollars	Dollars	Dollars	Dollars
Farm-grown feed (pound of digestible nutrient) 2/	0.16	0.03	0.04	0.04
Family labor (hour)	0.35	0.24	0.39	0.65

Based on taoles 6, 7, 8, and 9.

1/ Gross value of production using 1940 farm prices, less cash expenses for feed purchased, veterinary services and medicines, expressed as a ratio in which the input items equal 1.

2/ "Digestible nutrients" refers to those constituents of any feed which are actually assimilated by the animal body, thus serving as a common denominator for expressing the total food value available from two or more kinds of feed. Pasture, purchased feed, and skim milk are excluded in this comparison.

In view of the characteristics of these farms, it is evident that the ideal livestock enterprise is one that has low feed requirements, that can utilize low grade pasture, and for which family labor is suitable. The disposition that is made of the limited quantity of farm-grown feed and purchased concentrates perhaps represents the most critical phase of farm operation and management. Net returns, expressed as a ratio to the pounds of farm-grown feed required, are preponderantly in favor of milk goats and least in favor of cattle, although the differences between cattle, hogs, and sheep are small (table 10). The net returns to the operator and his family for the labor they expend on different enterprises, disregarding the value of feed, indicates that sheep are the most advantageous in this regard, hogs and goats being about the same, and cattle the least advantageous. Expressing the net returns as a ratio to the cash expenses would be in favor of sheep and goats. However, cash expenses are comparatively small for each of the enterprises.

A good perspective of the limiting aspects of each enterprise as it relates to opportunities for maximizing total returns is obtained by comparing the usual inputs necessary to obtain a given gross income (table 11).

Table 11.- Comparison of gross returns and production requirements for four livestock enterprises, Western Ozark Mountain Area, Arkansas

Item	Unit	Producing unit			
		Doe	Cow	Sow	Ewe
Gross value of production per unit 1/	Dollar	6.45	31.60	33.60	5.25
Units required to produce $100 gross income	Number	15.5	3.2	3.0	19.0
Feed and labor used in producing a gross return of $100:					
Feed:					
Farm-grown grain	Pound	0	746	2,520	1,430
Purchased concentrates	do	0	480	450	0
Hay	do	1,240	4,800	0	2,670
Skim milk	Gallon	0	0	900	0
Cash expenses:					
Purchased feed	Dollar	0	7.20	6.75	0
Other	do	1.10	3.20	0	1.90
Labor:					
Family	Hour	279	368	240	152

1/ The gross value was calculated by applying the average farm prices received in 1940 to the various items of net production which were available for sale or home use.

Goats versus Cattle as a Dairy Enterprise

Considering the limited feed and pasture available on most of these farms, the evidence points rather conclusively to the superiority of milk goats over cattle for dairying. The only feature in which cattle surpass goats is the ready marketability of calves as contrasted with kids. This is more than offset, however, by the ability of goats to produce milk on limited feed. Based on usual handling and feeding practices 1,030 pounds of total digestible nutrients (in addition to grazing) are required for a cow to produce 69 pounds of butterfat and 235 pounds of beef. Disregarding temporarily the advantages of substituting roughage for concentrates, the same quantity of total digestible nutrients, if utilized with milk goats, would produce 590 pounds of butterfat.

Expressed in terms of market values, the advantages of goats are more readily apparent. In 1940 these farms received, at the farm, an average price of 22 cents a pound for butterfat and $7 a hundredweight for beef. Thus, the feed used for one cow resulted in production valued at $32, whereas the same quantity of digestible nutrients would be adequate for 26 milk goats which would produce $130 worth of butterfat alone.

Adding to this difference any value realized from the disposal of 18 kids and the desirability of feeding roughage instead of concentrates, it becomes evident that milk goats provide a substantially more advantageous means of utilizing available feed and family labor than do cattle. Moreover, the fact that milk goats are able to utilize open range the greater part of the year permits most farms to expand the enterprise to a larger volume of milk production than is possible with the cattle enterprise.

The Hog Enterprise and Dairying

Although the hog enterprise obviously falls short of meeting the need for low feed requirements, it does produce a rate of return for the feed used comparable to that obtained with sheep and cattle. Moreover, in examining the feed requirements of hogs it should be kept in mind that about half of the grain is used for finishing "meat hogs" for home use, while the bulk of the feed for hogs to be sold consists of skim milk. Hence, the goat-dairy-hog relationship offers considerable opportunity for increasing farm earnings. The chief disadvantage of goats compared with cows is the lack of a dependable market for kids. The use of skim milk for producing pork which does command a generally dependable market would seem to compensate fully for this disadvantage. Farmers who have only meager quantities of feed at their disposal could profitably expand the hog enterprise as well as the milk goat enterprise, at the expense of cattle.

Sheep

How well sheep fit into the farm organization depends primarily upon the availability of pasture and feed. They unquestionably represent a desirable secondary enterprise on farms that have the necessary pasture and shelter facilities and that can produce feed in sufficient quantities. However, the usual family can ill afford to give sheep first choice of the feed available.

In deciding whether he can profitably operate a sheep enterprise, the farmer perhaps would do well to approach the question in this way. His labor and feed will earn him the greatest returns through milk goats and hogs. After expanding these enterprises to approach a reasonable maximum, any surplus feed or labor can be utilized profitably by either sheep or cattle, providing suitable pasture and other facilities are available. The choice between sheep and cattle would be governed chiefly by the farmer's abilities and inclination.

An Illustrative Situation

In the foregoing discussion the usual production rates and requirements for each of the major livestock enterprises have been presented and compared. The relationship of these considerations to the choice of livestock enterprises can be brought more sharply into focus, however, by considering them in terms of a specific situation.

Farm 19 presents a common situation in which the limited opportunities for production of feed and a small acreage of improved pasture emphasize the advantage that can be gained through careful choosing of livestock enterprises (table 12). By grazing his stock on open range the greater part of the year and by feeding at rates somewhat higher than usual, the operator of this farm kept 2 cows, 11 ewes, and 2 sows. This inventory of productive livestock is near the maximum that can be supported by this farm without modifying the choice of enterprises or without buying considerable feed. The limited dairy production necessitates substituting grain for skim milk in connection with the hog enterprise, and lack of feed and pasture discourages the expansion of either

the cattle or the sheep enterprise. In a situation like this, goat dairying, supplemented by the production of pork, has its greatest possibilities.

Table 12.- Land organization and normal feed and pasture production, farm 19, Western Ozark Mountain Area, Arkansas

Item	Acres	Normal production	
		Unit	Quantity
Corn	5.5	Bushel	100
Hay - mixed legumes and native grasses	6.0	Ton	4
Open pasture	12.0	Cow months	18
Woodland	16.0	do	8
Farmstead and garden	1.5	--	--

Assuming normal rates of production and prices equal to those of 1940, this farm would obtain gross receipts of $150 from the present livestock program (table 13). By replacing the 2 cows and 11 ewes with 60 goats (45 of which would normally be suitable for milking) and adding 3 sows to utilize the available skim milk, gross receipts of $372, or an increase of $222, could be obtained with only slight changes in operating expenses and capital investment, and with about the same quantity of farm-grown feed. Moreover, as the farm prices obtained for butterfat and pork were unusually low in 1940, the advantage of the suggested livestock program is enhanced by using prices which are more nearly normal. If the average prices obtained by Arkansas farmers for these products during 1935-39 are applied, the present livestock program would produce gross receipts of $147, whereas the suggested livestock program would produce gross receipts of $427.

The suggested livestock for farm 19 has an advantage over the present program because it would enable the operator to use more effectively the grazing opportunities afforded by the cut-over land on his farm and the adjacent open range. In expanding his operations in this way, he would, in turn, use the available family labor more effectively. The rate of returns per hour of labor consumed would not be increased, but it is important to recognize that changes in farm organization which increase the opportunity to use the available man power are as desirable as are changes which increase the rate of returns per hour.

The labor force on this farm consists of the operator, his wife, and two boys over 14 years of age -- a force that can easily provide 3,600 man-hours of work annually. The crop enterprises require an estimated 320 man-hours and the present livestock program requires approximately 480 man-hours. The suggested livestock program would increase the labor for livestock to 1,200 man-hours and would provide about the same rate of returns per hour as is now obtained. Moreover, this increased demand for labor would still leave ample time for miscellaneous farm chores and work off the farm.

The considerations taken into account in suggesting a listveosk program for farm 19 are adaptable to other farms. However, it is not implied that all farms could be most profitably organized as goat dairy-hog farms. When requirements for pasture and feed can be met, other livestock enterprises may be successfully incorporated. Moreover, a limited supply of farm-grown feed is not necessarily an unsurmountable obstacle to expanding livestock operations. If adequate pasture and other facilities are available, each of the four enterprises discussed could be profitably operated on the basis of buying the small quantities of supplemental feed which are needed.

Table 13.- Present and suggested livestock programs for farm 19, Western Ozark Mountain Area, Arkansas

Section A.- Present livestock program 1/

Kind of livestock and livestock products	Animals kept	Farm-grown feed used annually 2/		Livestock production and disposal			
		Corn	Hay	Total production	Quantity used in home	Sales	
						Quantity	Value 3/
	Number	Bushels	Tons	Pounds	Pounds	Pounds	Dollars
Workstock	1	25	2.0	-	-	-	-
Cows:	2	19	1.0	-	-	-	-
Beef	-	-	-	470	-	470	33
Butterfat	-	-	-	138	138	-	-
Sows:	2	42	0	-	-	-	-
Pork	-	-	-	1,120	250	870	52
Ewes:	11	14	1.0	-	-	-	-
Mutton	-	-	-	748	-	748	52
Wool	-	-	-	50	-	50	13
Total	xx	100	4.0	xx	xx	xx	150

Section B.- Suggested livestock program

Kind of livestock and livestock products	Animals kept	Farm-grown feed used annually		Livestock production and disposal			
		Corn	Hay	Total production	Quantity used in home	Sales	
						Quantity	Value
	Number	Bushels	Tons	Pounds	Pounds	Pounds	Dollars
Workstock	1	25	1.5	-	-	-	-
Milk goats:	60	-	2.5	-	-	-	-
Butterfat	-	-	-	1,012	138	874	192
Kids 4/	-	-	-	18	-	18	27
Sows:	5	75	-	-	-	-	-
Pork	-	-	-	2,800	250	2,550	153
Total	xx	100	4.0	xx	xx	xx	372

1/ Based on "usual" production and feeding rates; hence data do not correspond exactly with those shown in tables 4 and 5.

2/ In order to balance the feed available against requirements corn has been substituted for hay in the case of cattle and for skim milk in the case of hogs.

3/ Based on average 1940 farm prices.

4/ Number of kids instead of pounds.

OVER-ALL ASPECTS OF GOAT DAIRYING

The facts indicate the desirability of goat dairying as a way of meeting the evident need for cash farm income and of utilizing the browse afforded by open range, much of which would otherwise be wasted. Therefore, it is timely to examine briefly some over-all aspects of the present status of the enterprise and the possibilities of its expansion. It is necessary to do this in terms of a fixed area.

Present Status of the Enterprise

In 1940, there were 49 farmers keeping an estimated total of 2,130 goats primarily for milking within the four civil townships to which this study was confined. Generalizing from data obtained from 22 of these operators, about 1,600 goats were milked, producing an estimated 900,000 pounds of milk of which 675,000 pounds, or 75 percent, was separated and sold as butterfat. The farms keeping milk goats represented 17 percent of all farms in these four civil townships.

Opportunities for Expansion of Goat Dairying

It is probable that goat dairying will, and should, be expanded, by increasing the number of goats on farms now raising them and by extending the enterprise to additional farms. Because the enterprise depends upon open range, the availability of this type of land is a tangible limiting factor.

These four civil townships contain an estimated 39,500 acres of open range and, according to the Census, an additional 17,200 acres of farm woodland (presumably similar in character to the open range), or a total of 56,700 acres of land that is suitable for goat browse. Estimates made by farmers indicate that 10 to 15 acres will support one goat without appreciably altering the vegetative pattern or bringing goats seriously in competition with other kinds of livestock for the use of the range. Using the more conservative limit of this estimate, the 56,700 acres of browse would support 3,780 goats, an increase of 77 percent over the number in 1940. If the usual size herd remained the same size as in 1940, the goat enterprise could be extended to an additional 40 farms, so far as browse is concerned.

Possibilities of Manufacturing Special Cheeses

The fact that goat's milk commands prices of from 15 to 30 cents a quart in metropolitan markets, as contrasted with the equivalent of about 8 cents a gallon when sold on a butterfat basis in 1940, has led to considerable speculation among the farmers, and in other quarters, concerning possible means of obtaining a more lucrative market than is now available. As fluid milk markets are remote, there is much seemingly well-founded interest in the possibility of utilizing the natural caverns in the area for the manufacture of certain of the more costly types of cheese for which goat's milk is suitable. Before such an

undertaking can be regarded as more than a possibility, manufacturing processes must be adapted to the local conditions. However, in view of the interest that has developed and because of the possible benefit that might accrue to farmers, it is desirable to discuss briefly two important considerations that would be involved in the production phase.

Minimum price differentials.- Among the more significant aspects of goat dairying are the simplicity of handling practices and the low costs of production. When selling cream these farmers generally rely on various no-cost cooling devices such as springs, cellars, and water-vats. By using such devices and by marketing the cream every second or third day, the bacteria count is kept within acceptable limits. But, in order to sell milk of a quality suitable for cheese manufacture, the milk would have to be sold daily and more carefully controlled, and probably more costly handling practices would be necessary. Moreover, the use of skim milk for hog feed would have to be foregone.

Any estimate of the price differential between whole milk and butterfat that would be necessary if the former is to be a more profitable means of disposal will involve considerations beyond the scope of this report. Entering into such an estimate, however, would be at least these three factors: (1) The feed value of skim milk -- under present practices the farmer can recover the equivalent of a bushel of corn from each 500 pounds of milk produced; (2) any capital outlay and increased operating costs incidental to the improved handling practices that may be required; and (3) the imputed, but none the less real, value of additional labor.

Production volume.- Insofar as dairy manufacturing is dependent upon a sustained volume of milk, present production practices suggest distinct complications. As 83 percent of the milk production occurs during a 6-months period (beginning with 15.7 percent of the total annual production in May and diminishing to 11.1 percent in October) a substantially larger number of goats would be required to maintain a given minimum volume through November or to develop a given volume in March than would be necessary for the 6-month period mentioned (table 14).

Table 14.- Volume characteristics of goat's milk production, Western Ozark Mountain Area, Arkansas 1/

Month	Distribution of annual production	Average daily production of 10 milking does	Milking does needed for average daily volume of 1,000 lbs. milk
	Percent	Pounds	Number
March	.1	.2	-
April	8.7	16.3	613
May	15.7	29.4	340
June	14.8	27.8	360
July	14.5	27.2	368
August	14.0	26.2	382
September	12.9	24.2	413
October	11.1	20.8	481
November	6.8	12.8	781
December	1.4	2.6	-

1/ Production figures are based on 4-percent fat content.

Of the total goat's milk produced during 1940 in these four civil townships, an estimated 675,000 pounds were separated and marketed as butterfat. Approximately 90 percent of this salable surplus was produced during the period May through October. Marketed as whole milk, it would have provided an average daily volume of 3,375 pounds. However, the volume would have diminished to an average of 2,490 pounds a day during the month of October. On the basis of information in this report, the volume produced in 1940 could perhaps be increased by 77 percent, assuming a continuance of present handling practices and full utilization of available range.

BUY DEFENSE BONDS AND STAMPS